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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/733,133	12/10/2003	Matthew J. Pohlman	H0005725-1050	8275

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Honeywell International, Inc.
Law Dept. AB2
P.O. Box 2245
Morristown, NJ 07962-9806

EXAMINER

SAVAGE, JASON L

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 06/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/733,133

Applicant(s)

POHLMAN ET AL

Examiner

Jason L. Savage

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>20050705, 20051210</u> . | 6) <input type="checkbox"/> Other: ____. |

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 9 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Moranne (GB 2073395).

Moranne teaches a heat exchanger comprising a plurality of plate members **1** with at least one set of fin members **6** is placed between the plate members **1** forming fluid passageways therein (Figure 1 and page 1, ln. 121 – page 2, ln. 29). Moranne further teaches that the layers are connected together by brazing (p. 2, ln. 66-74). Moranne also teaches other fin sets **6** brazed between the plate members **1** (Figure 1).

Regarding the limitation that the first set of fins being made of a base metal different from said plurality of plate member, Moranne teaches that the fins **6** may be one metal such as stainless steel while the base plate member **1** may be a light metal such as aluminum (page 2, ln. 37-54).

Regarding claim 9, Moranne would anticipate the claim rejections wherein a first and second set of fins **6** are made of stainless steel.

.Regarding claim 33, the formation of the heat exchanger of Moranne would meet the method limitations in the claim where a first fin of a metal different than the plate

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members is brazed and further wherein a second fin member and third plate member are brazed thereto (figure 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-3, 10-13, 15 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moranne (GB 2073395).

Regarding the limitation in claims 2-3 and 34, although Moranne does not explicitly recite the processing materials or temperatures used when brazing, given the teaching that one of the members is aluminum it would have been obvious to one of ordinary skill to have recognized to keep the temperature as low as possible.

Regarding claims 10-11, although Moranne is silent to the specific alloy claimed for the first and second fin materials, it would have been within the purview of one of ordinary skill in the art at the time of the invention to have recognized that any stainless steel alloy including those claimed could be employed with a reasonable expectation of success.

Regarding claim 12, Moranne depicts an embodiment wherein 3 fin sets are applied in the heat exchanger however it does not explicitly recite a 4th fin layer is

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formed. However, it would have been obvious to one of ordinary skill in the art to have applied more than the 3 fin layers depicted in the figure in order to form a larger sized heat exchanger.

Regarding claim 13, although Moranne is silent to the first and third passageway orientation and their relative directionality in comparison to a second and fourth fluid passageway. However, the formation of a 4 or more layer heat exchanger having passageways which are perpendicular to adjacent passageways is known and would have been an obvious structure for the heat exchanger.

Regarding claim 15, absent evidence to the contrary, the braze filler of Moranne would not appear to cause excessive erosion when bonding the plate members using the brazing material.

Claims 4-8, 14, 16-32 and 35-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moranne (GB 2073395) in view of XP'365 (Article State of the Art of Titanium-Based Brazing Filler Metals – XP0017735).

Regarding claims 4-5, Moranne teaches what is set forth above but it is silent to the braze material being composed of the claimed elements. XP'365 teaches that braze alloys of Ti-Zr-Cu-Ni are known to be particularly suitable in heat exchangers (p. 38, 3rd column, last full paragraph).

Regarding claims 6-7, XP'365 teaches braze alloys having a brazing composition (page 38, Table 3, Alloy Bti-4).

Regarding claims 8 and 16, although Moranne teaches that the plate members 1 may be a light material such as aluminum, it is silent to the plate members being titanium. However, XP'365 teaches that titanium alloys provide good properties such as low density, high strength, fatigue, corrosion resistance and good strength-to-density ratio (p. 36, first full paragraph). XP'365 further teaches that heat exchangers comprising titanium alloys are known (p. 38 table 3 and column 3m last full paragraph). As such, it would have been obvious to one of ordinary skill in the art to have modified the heat exchanger of Moranne and substituted titanium for the light metal alloy material for the plate member with a reasonable expectation of success. One would have been motivated to make such a substitution in order to form a heat exchanger that exhibited desirable properties including low density, high strength, fatigue, corrosion resistance and good strength-to-density ratio. Regarding the limitation in claim 8 that the plate is the specific alloy of Ti-21S, absent a teaching of the criticality or showing of unexpected results from the use of this specifically titanium alloy it would not provide a patentable distinction over the prior art. It would have been obvious to one of ordinary to have used any titanium material or alloy with a reasonable expectation of success.

Regarding claims 14 and 22, although the references are silent to the tensile breaking strength over one square inch section, given that Moranne in view of XP'365 would have formed the same structure using the preferred brazing material, it is the position of the Examiner that the claimed tensile breaking strength over the claimed area would have been within a similar range as that claimed. Regarding the further limitation in claim 22 that excessive erosion does not occur, absent evidence to the

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contrary, the brazed structure of Moranne in view of XP'365 would not appear to cause excessive erosion when bonding the plate members using the brazing material.

Regarding claims 18-20, although the references are silent to the specific alloys claimed for the plate and fin members, it would have been within the purview of one of ordinary skill in the art at the time of the invention to have recognized that any stainless steel or titanium alloy including those claimed could be employed with a reasonable expectation of success.

Regarding claims 21 and 37, Moranne depicts an embodiment wherein 3 fin sets are applied in the heat exchanger however it does not explicitly recite a 4th fin layer is formed. However, it would have been obvious to one of ordinary skill in the art to have applied more than the 3 fin layers depicted in the figure in order to form a larger sized heat exchanger.

Regarding claims 23-24, Moranne in view of XP'365 would read on the claim limitations for the reasons set forth above. In particular, the prior art teaches the heat exchanger comprising plate members which may be titanium, fin members of a different metal such as stainless steel brazed to the plate members and the braze comprising Ti, Zr, Cu and Ni within the ranges claimed. As was set forth above, since the prior art discloses stainless steel as the fin material, use of the claimed stainless steel alloys would have been obvious.

Regarding claims 25-29, the references are silent to the first set of fins being made of stainless steel and the second set of fins being made of the claimed titanium alloys. However, Moranne teaches that stainless steel alloys may be used for the fins

and XP'365 teaches that titanium alloys may be used for the fins. Absent a teaching of the criticality or showing of unexpected results, it would have been within the purview of one of ordinary skill in the art at the time of the invention to have recognized that the heat exchanger containing multiple layers of plate and fin layers could comprise layers having different compositions with a reasonable expectation of success. One would be motivated to form a composite containing layers of differing materials in order to tailor the heat exchanger's properties such by providing materials that could withstand high temperatures as well as by providing materials which would simultaneously providing low density, high strength, fatigue and corrosion resistance.

Regarding claim 30, as was set forth previously , the formation of four sets of fins and forming the fins out of a stainless steel alloy would have been obvious in view of the prior art.

Regarding claims 31 and 38, although the references do not explicitly recite the adjacent passageways that are formed are perpendicular to each other, the claimed structure is conventional and is used to provide a cross current flow between the adjacent sets of fins. It would have been obvious to one of ordinary skill in the art to have aligned the fins in such a manner in order to produce a cross current flow in the heat exchanger.

Regarding claim 32, Moranne and XP'365 meet the claim limitations for the reasons set forth above. Regarding the newly disclosed limitation that the third and fourth set of fins are made of a material different from the plurality of plate members,

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the prior art would meet the limitations since the plate members are a light alloy such as titanium and the fins are an alloy of a metal such as stainless steel.

Regarding claims 35-36, the prior art would meet the claim limitations for the reasons set forth above including that XP'365 teaches the claimed brazing alloy, the use of a titanium alloy for the plate member would have been obvious and further wherein the use of stainless steel for the fin members is known.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Savage whose telephone number is 571-272-1542. The examiner can normally be reached on M-F 6:30-4:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Jason Savage
6-15-06


JENNIFER C. MCNEIL
SUPERVISORY PATENT EXAMINER
u/15/06